Answers

1. The pseudocode algorithm below is intended to calculate the average birth weight of all babies born in a hospital over a period of time, and the maximum and minimum birth weight recorded. It does not give the correct results.

```
1   total = 0
2   maximum = 0
3   minimum = 100
4   numB = 0
5   weight = 0
6   while weight != -1
7       weight = float(input("Please enter weight"))
8       if weight != -1
9           total = total + weight
10          if weight > maximum
11              weight = maximum
12          endif
13          if weight < minimum
14              weight = minimum
15          endif
16          numB = numB + 1
17    endif
18  endwhile
19  average = total / numB
20  print(numB)
21  print(average)
22  print(maximum)
23  print(minimum)
```

(a) Give **five** line numbers which show the program structure **sequence**. [1]

1 – 5 (1)

(b) Give the line numbers on which **iteration** starts and ends. [2]

6 (1) – 18 (1)

(c) Give the line numbers on which **selection** starts and ends. [2]

8 – 17 (1), 10 – 12 , 13 – 15 (1)

(d) How will the user indicate that all the baby weights have been entered? [1]

By entering −1

(e) There are **two** logic errors in the algorithm. Find and correct the errors. [2]

Line 11 should say maximum = weight (1)

Line 14 should say minimum = weight (1)

(f) Complete the trace table below for the corrected algorithm, if the user enters the following values: 3.0, 4.4, 2.8, 3.4, -1 [6]

See program H6 Qu1 baby weights.py in folder

total	maximum	minimum	numB	weight	average	OUTPUT
0	0	100	0	3.0		
3.0	3.0	3.0	1	4.4		
7.4	4.4	3.0	2	2.8		
10.2	4.4	2.8	3	3.4		
13.6	4.4	2.8	4	-1	3.4	4 3.4 4.4 2.8

- 1 mark for each correct row up to 5 marks
- 1 mark for the final average and OUTPUT

2. A program produces statistics on the number of passes and distinctions in an exam, and the number of candidates who took the exam. A student achieving a Distinction is also counted among the number of students who passed the exam. The exam is graded as follows:

50-79	Pass
80-100	Distinction

The program has been written in pseudocode, but has errors in it.

The programmer tests it by inputting the exam results 60, 65, 70, 90, 95, 100. The end of data entry is signified by entering a dummy mark of -1.

The program outputs the following results:

Number of students: 7

Number of students with pass or distinction: 6

Number of students with distinction: 0

Average mark: 1.0

The pseudocode is given below:

```
mark = 0
studentpass = 0
distinction = 0
numstudents = 0
totalmark = 0
while mark != -1
       mark = int(input("please enter mark, -1 to end: "))
       if mark >= 50 then
           studentpass = studentpass + 1
       else
           if mark >= 80 then
               distinction = distinction + 1
           endif
       endif
       numstudents = numstudents + 1
       totalmark = totalmark + 1
endwhile
averagemark = totalmark / numstudents
print("Number of students: " + str(numstudents))
print("Number of students with pass or distinction: " +
        str(studentpass))
print("Number of students with distinction: " + str(distinction))
print("Average mark: " + str(averageMark))
```

Locate the three errors, and suggest how the coding should be corrected. [6]

Error 1

The contents of the loop shouldn't run if -1 is entered. (1) An if statement can be used to prevent this. (1)

Error 2

There should not be an else statement. (1) The second if statement

"if mark >= 80 then

distinction = distinction +1

endif"

is a separate statement. (1)

Error 3

totalMark = totalMark + 1 (1) should be

totalMark = totalMark + mark (1)

See (correct) Python program in folder

H6 Qu2 passes and distinctions.py

[Total 20 Marks]